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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/485,464 02/04/00 YAMAMURA K 48531

IM62/0612
HERBERT I CANTOR
EVENSON MCKEOWN EDWARDS & LENAHAH PLLC
1200 G STREET NW
SUITE 700
WASHINGTON DC 20005

EXAMINER

COY, N

ART UNIT

PAPER NUMBER

1742

DATE MAILED:

06/12/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 09/485,464	Applicant(s) YAMAMURA ET AL.	
	Examiner Nicole Coy	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- | | |
|---|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 20) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is responsive to the amendment filed May 4, 2001. Applicant has amended claims 1-4 and added new claims 5-10. Claims 1-10 are pending in the application.

2. Applicant's arguments filed May 4, 2001 have been fully considered but they are not persuasive. Applicant has amended claims 2 and 4 to indicate that the amount of residual austenite over the entire cross section of the element is 0 % by volume. However, the Examiner does not find support for such amendment in the specification as originally filed.

Applicant states that while Matsumoto et al. discloses less than 10 volume % residual austenite, In Fig. 9, Matsumoto et al. discloses that the average residual austenite is less than 10 %, and Matsumoto et al. discloses an example of 6.4 %. However, the teachings of Matsumoto et al. can not be limited to the preferred embodiments, but must be taken in their entirety. Matsumoto et al. teaches that the concentration of retained austenite should remain less than 10 %. Matsumoto et al. further discloses that the dimensional stability of the bearing is better when the average concentration of retained austenite present is lower. Hence there would be motivation to have 0 % retained austenite so as to improve the dimensional stability. Furthermore, it is well known in the prior art to have bearings with 0 vol % austenite for the purpose of producing bearings with high dimensional stability (see cited prior art reference

Hirakawa et al). It would have been obvious to one having ordinary skill in the art at the time the invention was made to find the optimum range of retained austenite, i.e. 0 vol %, since it has been held that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 105 USPQ 233. It is the burden of applicant to show that the claimed amount of retained austenite achieves unexpected results relative to the prior art range.

With respect to claim 2, Matsumoto et al. discloses a composition of steel used for the inner and outer rings as well as the rolling element. This composition overlaps that as claimed by applicant for both the inner and/or outer ring and for the rolling element. It is the burden of the applicant to provide the criticality of the claimed range.

With respect to claim 4, it is well known in the prior art to use rolling elements made of ceramics instead of steel for the purpose of avoiding development of indentations at high temperature and increasing wear resistance (see cited prior art reference Tsushima et al). Thus it would have been obvious to use a rolling element made of ceramics in order to increase wear resistance and avoid indentations at high temperatures.

3. The indicated allowability of claim 3 is withdrawn in view of the newly discovered reference(s) to 6,086,686. Rejections based on the newly cited reference(s) follow.

Claim R jections - 35 USC § 112

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4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 2, and 4 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant has amended claims 1, 2 and 4 to contain the phrase "over the entire cross section of one of the inner ring, the outer ring, and the rolling element". However, the support for this phrase is not found in the specification as originally filed. Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. Claims 1, 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al.

Matsumoto et al. discloses a rolling bearing in which a bearing ring and or a rolling element comprising a steel containing alloy ingredients of C: 0.2 to 1.23 % by weight (Table 1), Si: 0.40 % by weight or less (Table 1), Mn: less than 2 % by weight (Col. 5, lines 44), Cr: 1 % by weight and Cr: 2 % by weight (Table 1) and Mo: 2% by weight or less (Col. 5, line 36). Matsumoto et al. further discloses that the heat treatment of the steel includes hardening and tempering (Col. 5, lines 3-4). Matsumoto et al. further discloses that the amount of retained austenite is less than 10 volume % (Col. 4, lines 44-45). Furthermore, Matsumoto et al. discloses a hardness of greater than 60 HRC (abstract).

Examiner notes that the phrase, in the pending claim, "by weight or less" encompasses the limitation of zero percent.

Matsumoto et al. further discloses that the dimensional stability of the bearing is better when the average concentration of retained austenite present is lower. Hence there would be motivation to have 0 % retained austenite so as to improve the dimensional stability. Furthermore, it is well know in the prior to have bearings with 0 vol % austenite for the purpose of producing bearings with high dimensional stability. It would have been obvious to one having ordinary skill in the art at the time the invention was made to find the optimum range of retained austenite, i.e. 0 vol %, since it has been held that where the general conditions of a claim are disclosed in the prior art,

it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 105 USPQ 233.

With respect to claim 2, Matsumoto et al. discloses a rolling bearing in which a bearing ring and or a rolling element comprising a steel containing alloy ingredients of C: 0.2 to 1.23 % by weight (Table 1), Si: 0.40 % by weight or less (Table 1), Mn: less than 2 % by weight (Col. 5, lines 44), Cr: 1 % by weight and Cr: 2 % by weight (Table 1) and Mo: 2% by weight or less (Col. 5, line 36). Matsumoto et al. further discloses that the heat treatment of the steel includes carbonitriding hardening and tempering (Col. 5, lines 3-4). Matsumoto et al. further discloses that the amount of retained austenite is less than 10 volume % (Col. 4, lines 44-45). Furthermore, Matsumoto et al. discloses a hardness of greater than 60 HRC (abstract).

Matsumoto et al. discloses a steel composition for either the rings or rolling element having compositional ranges which overlaps those of applicants.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to find the optimum composition for the outer ring and rolling element, since it has been held that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 105 USPQ 233.

In the instant case, Matsumoto et al. discloses steel with ranges which overlap those as claimed by applicant and it would have been obvious to find the optimum range for the outer ring and rolling element.

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With respect to claim 4, Matsumoto et al. does not disclose a rolling element formed of ceramics. Matsumoto et al. teaches a rolling element made of steel.

It is conventional in the prior art to use ceramic rolling elements with steel inner and outer rings in the same field of endeavor for the purpose of increasing wear resistance of the rolling bearing.

It would have been obvious to one having ordinary skill in the art at the same time the invention was made to modify the rolling bearing as taught by Matsumoto. Et al. by using a ceramic rolling element in order to increase the wear resistance of the rolling bearing.

8. Claims 3 and 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al. in view of Tanaka et al.

Matsumoto et al. discloses the invention substantially as claimed (see paragraph 6 above).

However, Matsumoto et al. does not disclose nitriding after hardening and tempering.

Tanaka et al. discloses (Col. 12, lines 22-26 and lines 40-43) forming a nitride layer on a rolling member at least 2 % or less of the diameter of the rolling member in the same field of endeavor for the purpose of preventing adhesion, decreasing friction and significantly improving fretting damage. Tanaka et al. further discloses (Col. 33, lines 40-44) that the nitride layer can be 20 μm , which is great than 3 μm as claimed by applicant. Tanaka et al. further discloses a surface roughness of 0.27 μm . Actual

overlap of all ingredients in prior art is not required; mere contact (i.e. end-point touching) or CLOSE APPROXIMATION is sufficient to establish prima facie case of obviousness; Titanium Metal Corp v. Banner, (CAFC 1985) 778 F2d 775, 227 USPQ 575. Since Tanaka et al. discloses the composition of the alloy in which the components and ranges are a close approximation to those being claimed, the disclosure establishes a prima facie case of obviousness.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Okita et al. teaches a rolling bearing. Hirakawa et al. teaches a rolling bearing. Tsushima et al. teaches rolling bearings and methods of producing the same.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicole Coy whose telephone number is (703)308-3860. The examiner can normally be reached on Monday-Friday 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (703)308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-3599 for regular communications and (703)305-7719 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0651.

Nicole Gay

nac
June 6, 2001

R. King
ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700